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The Effects of Incentives on Workplace Performance: A Meta-analytic Review of Research Studies[1]

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ABSTRACT

A meta-analytic review of all adequately designed field and laboratory research on the use of incentives to motivate performance is reported. Of approximately 600 studies, 45 qualified. The overall average effect of all incentive programs in all work settings and on all work tasks was a 22% gain in performance. Team-directed incentives had a markedly superior effect on performance compared to individually-directed incentives. This effect was not influenced by the location of the study (business, government, or school), the competitive structure of the incentive system (programs where only the highest performers get incentives versus programs where everyone who increased performance receives incentives), the type of study (whether the study was a laboratory experiment or a field study), or the performance outcome (quality, quantity, or both). In these studies, money was found to result in higher performance gains than non-monetary, tangible incentives (gifts, travel). More research is needed on the relative cost-benefit of cash and gift incentives, and the way different types of tangible incentives are selected. Long-term programs led to greater performance gains than shorter-term programs did, and somewhat greater performance gains were realized for manual than for cognitive work. Explanations based on cognitive psychological principles accompany each of the analyses.

Introduction

Meta-analysis is a relatively new statistical procedure that allows us to summarize the results of many different experiments conducted on a specific topic by different researchers at different points in time. It is vastly superior to previous "box score" methods of summarizing experimental results. Box score methods of summarizing research involve counting the positive, negative, or no results of studies on a topic, summing the results and reporting the number of studies "in favor or opposed" to a generalization such as "incentives boost performance." A number of research design experts such as Jenkins, Mitra, Gupta, and Shaw (1998) have provided compelling evidence that the box score method often gives misleading information about

the results of many experiments. Meta-analytic approaches were developed to overcome these problems and allow researchers to estimate the effect size of treatments such as incentive systems as a percentage of a standard deviation change in performance due to the strategy being investigated. Expressing the impact of a performance improvement strategy as a percentage of a standard deviation allows us to quickly estimate the percentage increase in performance that can be expected from the strategy that was studied. These estimates have been shown to be highly accurate, provided that well designed studies are utilized for the meta-analysis. This report summarizes our attempt to perform a comprehensive meta-analysis of incentive experiments conducted in the field and in the laboratory.[2]

Plan of the Study

Financial incentives, and their use and misuse, have long been the focus of researchers and practitioners dedicated to maximizing human performance. What has been lacking, however, is a sound methodological review of the incentives literature. Jenkins et al. (1998) provided the first meta-analysis of the financial incentives literature. To be included in their meta-analysis, studies had to: (a) be between 1960 and 1996; (b) be empirical in nature; (c) not involve self-report measures; (d) focus on incentives geared toward the individual, not groups or organizations; (e) have a control or pre-measure comparison groups; (f) focus on monetary incentives; and (g) use adult populations. Out of numerous articles, 39 articles (with 47 studies) qualified. Effect sizes (corrected correlations) were .34 (a 12% increase) in performance quantity, and .08 (a 3% increase) in performance quality. In their analysis, setting and theoretical framework mediated the relationship, but task type did not.

The work of Jenkins et al. (1998) was a major step in the effort to bring a sense of unity, coherence, and order to a field of study that is in desperate need of such attributes. However, the Jenkins et al. study neglected to include an examination of a number of variables such as the type of incentive, type of program, length of term of the incentive program, and whether the incentive was given to groups or individuals (among other important issues), nor did it seek to explain the results of the study in a way that would be useful to practitioners (for example, attempt to explain why certain types of incentive programs work better than others according to psychological performance theories). We began this effort with the belief that performance psychology and carefully designed performance research can help us improve the diagnosis of, and prescriptions for, performance deficits (Clark & Estes, 2002; Swets, Dawes, & Monahan, 2000). In that spirit, and to examine other (presumably) equally important variables, the present meta-analysis was conducted.

Rules for Including Studies in the Meta-analysis Review

Meta-analysis is an area where the old saying about "garbage in, garbage out" is an important caution. When poorly designed or analyzed studies (garbage in) are included in a meta-analysis, the results are not dependable (garbage out). We read literally hundreds of studies to find

those that were well designed. We did not exclude any study from our analysis because of its results, only because of its design. To be included in the meta-analysis, studies had to be empirical, be conducted between 1960 and 2000, involve the use of a baseline (control group, pre-treatment measure of average performance, or a similar estimate of what people were doing before the incentive program was started), and involve the use of incentives to enhance performance. We were dismayed to find that most (approximately 83%) of the published studies of incentive programs did not collect any information about the level of performance before an incentive program was introduced. We also required the reporting of statistical means, standard deviations, numbers of subjects included in the studies and their statistical outcomes (*t* or F statistics or a similar comparison). Out of approximately 600 articles listed in PsycINFO and other databases, only 45 research reports met our qualifications, and 64 acceptable incentive/performance research comparisons were described in those 45 reports. Our meta-analysis included some of the variables identified by Jenkins et al. (1998), but added others deemed important from a psychological perspective. We turn next to a description of the features of the selected experiments that we studied.

Design Factors of Selected Incentive Studies

Meta-analysis allows researchers to pick out specific features of performance programs and analyze the positive, neutral or negative contributions of each feature on performance gains or losses. Because of previous discussions of incentive programs in existing research and the interests of people who work in this area, before the studies reported here were analyzed we chose to identify and examine the separate effects of nine factors: (1) the location of the study (business, government, or school/university); (2) incentive type (money, gifts, social recognition); (3) competition (giving incentives to the highest performers versus to everyone who performs above a preset level); (4) program term (less than a month, 1 to 6 months, more than 6 months); (5) type of participant (individuals versus teams); (6) type of performance (manual labor versus mental work); (7) study type (laboratory simulation of a "real" job, laboratory experiment, or field research in a work setting); (8) quantity and/or quality performance goals; and (9) type of performance motivation incentivized (choice—actively pursuing a new work goal; persistence—continuing to an established work goal; or mental effort—working "smarter" at either a new or old performance goal). Each of the study factors we analyzed is discussed next.

1. Location

Some studies were conducted in actual business or government work sites while others were conducted on college campuses. Three settings were identified: (1) private businesses (for-profit organizations); (2) public businesses (meaning entities such as governments, the military, and city transportation services); and (3) college or university campuses. We expected that the setting might make a difference in the incentive/performance relationship and that studies conducted in laboratory set-

tings might show stronger effects of incentives than those conducted in actual work settings (because the laboratory permits more control of interfering events than an actual work site might).

2. Incentive Type

Although there are potentially a very large number of incentives that could be utilized, a useful distinction is between the material and the non-material. Additionally, material (or tangible) incentives could be broken down further into monetary and non-monetary. Thus, three incentive types were identified: (1) monetary (cash); (2) non-monetary tangible (rewards such as restaurant coupons for meals or vacation trips); and (3) non-monetary intangible ("employee of the week" recognition, positive performance reviews, and public praise from management). None of the studies identified used incentive type 3 (non-monetary intangible), though this could not have been known before the meta-analytic review of studies began. It was expected that different types of incentives might have different levels of impact on performance.

3. Incentive Competition

In some incentive programs, there are a limited number of incentives available, and not everyone who meets a particular performance standard will necessarily obtain the desired incentive. In these competitive programs, only the highest performers get an incentive bonus. In other programs, everyone participating in the incentive program can potentially earn a bonus if they meet or exceed a preset performance goal. Thus, two incentive types were identified: (1) criterion-based (everyone can get an incentive if they increase performance to pre-set levels); and (2) competitive (only those individuals who are the highest performers get incentives). Research (Bandura, 1997) indicates that for individuals to thrive in a competitive milieu they need high levels of self-efficacy (akin to confidence in one's ability to perform a specific type of task, not general confidence). Failures can lower one's self-efficacy perceptions. In light of the psychological research on competition (Deci, 1981; Reeve, 1996), we expected that the competitive incentive programs might be less effective than those where everyone who increases their performance to agreed levels is eligible to receive an incentive.

4. Incentive Program Term

Some incentive programs last only a few days or weeks while others go on for years. It was decided to categorize the length of incentive programs in the following way: (1) long-term (6 months or longer); (2) intermediate-term (1 month to 6 months); and (3) short-term (less than one month). We expected that the duration of an incentive program might influence their effect and expected that short-term programs might be more effective. In most cases, shorter programs tend to be laboratory based and so it is easier to maximize their impact and minimize the interfering events often found in field studies.

5. Team and Individual Incentive Programs

People either work as individuals, or as parts of units. Various incentive programs target either the individual or the group. Therefore, two participant categories were identified: (1) individual; and (2) team. Presum-

ably, individuals have more control over an outcome when it is more or less under their individual control. As a member of a group, an individual may in fact put in considerable effort, but still not realize any bonus because of performance lapses on the part of team members. Therefore, we expected that incentives targeted to individual employees would be more powerful than team incentives.

6. Mental and Physical Work Tasks

Performance specialists often make the distinction between "mental" and "physical" work tasks. We were therefore interested in whether incentives had more or less impact on these two different types of work tasks, which we identified as: (1) cognitive; or (2) manual labor.

7. Incentive Study Type

Many people believe that studies performed in real work settings have different results and are more generalizable than studies performed in a research laboratory. While there is very little evidence for this belief, we decided to see if this expectation held up in the incentive studies. Thus we identified three study contexts for the experiments we reviewed: (1) typical laboratory experiments where participants know they are in an experiment; (2) laboratory simulation (where an attempt is made to make an experiment as realistic and authentic as possible); and (3) field studies conducted in actual work settings.

8. Quantity and Quality Performance Goals

Sometimes employers wish to increase performance quantity (more or less of something); at other times, improvement in the quality of performance is required; and occasionally both quantity and quality must be improved. In keeping with these goals, we looked for changes in performance when: (1) quantity; (2) quality; and (3) both quantity and quality improvements were incentivized. We reasoned that quantity is far easier to measure and is less susceptible to subjective judgment about performance quality. We reasoned that employees might be more willing to put in extra time and effort to realize quantity increases but not quality gains since quantity increases are more reliably judged and can be more fairly rewarded.

9. Motivation Outcomes

Though generally not an explicit part of the incentive literature, employers incentivize performance because they want to see gains in quality and/or quantity. In reality, the psychology of performance suggests a two-stage process whereby incentives provide value for increased motivation and increased motivation then engages task-relevant knowledge and skill to drive an increase in performance (Clark & Estes, 2002). Increased motivation must be supported by knowledge and skills to be effective. In work motivation research, three motivational outcomes have been identified (see Clark & Estes for an extensive discussion of this issue): (1) actively choosing to do work rather than "intending" to do it (called "choice" or "active choice" in this study); (2) persistence at a task in the face of distractions and competing work priorities (called "persistence"); and (3) working smarter by investing more "mental effort" to create new approaches and tune old

strategies so that they are more effective and efficient. It is quite possible that incentives will have differential effects on each of these motivational outcomes. Choice is the initial buy-in to specific types of performance; persistence is maintenance (consistency and time-based), and mental effort is concerned with quality (mental energy-based). As was noted before, it is probably easier to measure persistence-based gains than choice and mental effort-based gains. Employees may react more favorably and quickly to persistence-based incentives than to choice or effort-based incentives.

There are perhaps an endless number of factors and categories of factors that can be identified and examined for potential effects on the efficacy of incentives. Examples would include gender, age, and ethnicity of employees, further specification of industry types and sectors (aviation, travel and tourism, etc.), length of time between completion of work and receipt of incentive, and the like. These nine were utilized because they have been demonstrated in prior research studies to have measurable effects on a variety of outcomes. Additionally, other factors such as those mentioned above were not specified in the literature, and as such could not be used in the meta-analysis.

Results of the Meta-analysis

As exemplified and summarized in Table 1, employees and other research participants who received performance incentives in the 64 comparisons we analyzed achieved an average 22% increase in work performance when compared with people who performed similar work and did not receive incentives (a standardized mean gain of 0.65 of a standard deviation). This 22% gain included all incentive programs, including those that did not work well. Much larger gains were achieved with some types of incentive programs and much smaller gains (and losses) with others to achieve this average. For example, the average performance gain realized for team incentives when all other incentive programs were removed from the analysis was a highly significant 48%. In the review that follows, we present the percentage increase in performance due to each of the nine factors described above accompanied by tables that list the average change in incentivized performance, the range of effect sizes in the studies that were examined and the number of studies or comparisons that were analyzed to yield our estimate of performance gains.

1. Location

While it initially appeared that there was a significant difference in the amount of performance gains realized in different settings, upon closer examination, this turned out not to be the case. Only one study of an incentive program in the "public business" (government) setting produced a 33% performance gain (see Table 1), followed by a 24% gain in a number of school and university settings and a 20% gain in many "for profit" business settings. The reader should exercise caution in generalizing these results since the one study conducted in a government setting cannot be considered representative. It is better to compare the effects of incentives in for-profit businesses with those of schools. While there is a slight difference in favor of schools, this differ-

Table 1
Effects of Incentive Program Location on Performance Gains

Location	% Gain	Effect Size	Lower	Upper	# of Studies
Business	20	0.58	0.51	0.64	26
Public	33	0.96	0.72	1.20	1
School	24	0.70	0.63	0.76	37
Mean (Total)	***22***	***0.65***	***0.60***	***0.69***	***(64)***

ence is not statistically significant at the traditional 95% confidence level. Thus, the most conservative conclusion from this review is that the setting of the study has no measurable impact on the relationship between incentives and performance. This finding is evidence against the traditional view that "field" studies are better than university or school based laboratory studies.

2. Incentive Type

When studies compared money with other tangible incentives (gifts, vacations, meals) the performance gains (see Table 2) for money (27%) were double those of the average gains produced by non-money but tangible gifts (13%). We believe that this finding, while impressive, should also be viewed with caution. First, the number of monetary incentive studies was more than four times the number of other studies. Additionally, we could not determine the actual cash value of the gifts and vacations given in the "non tangible incentive" category in the studies we reviewed. It is possible that the actual cost of the gifts used for incentives might have been low enough that the 13% gain in performance was cost-effective. An expensive vacation or a meal at an exclusive restaurant might be purchased by a business at a very favorable rate if the providers are attempting to increase their customer base. Much more research needs to be performed on the issue of cost-benefit of different types of incentives. However, if the "cost"

Table 2
Effect of Type of Incentive on Work Performance

Incentive Type	% Gain	Effect Size	Lower	Upper	# of Studies
Monetary	27	0.79	0.73	0.85	52
Non-monetary tangible	13	0.38	0.31	0.46	12
Mean (Total)	***22***	***0.65***	***0.60***	***0.69***	***(64)***

of both types of incentives in these incentive programs was roughly the same, our analysis strongly indicates that monetary incentives are better because they appear to produce twice the performance gain as non-monetary tangible incentives.

3. Incentive Competition

Although the percentage increase in performance from competitive incentive programs is larger than that of programs where everyone has the possibility of earning a bonus (27% vs. 22%), a statistical analysis of variance revealed no significant difference between the means ($p = .17$). Therefore, from a statistical standpoint, the two types of programs are equally effective. This finding may be due in part to the fact that many fewer competitive programs were examined in studies and the larger number of non-competitive programs may have included some that were very poorly implemented. Yet it stands to reason that, for certain organizations (for example sales), a highly competitive bonus program may produce higher performance because they are part of the "culture." In non-sales divisions or organizations employees may not want to participate in competitive programs because they may consider their chances of earning a bonus too small to be worth their investment of extra effort. Since both competitive and non-competitive programs realize sizeable performance gains, management may want to consider factors such as organizational culture and employee opinions in deciding which kind of program to implement.

4. Incentive Program Term

This analysis indicates that the longer the implementation of an incentive program, the greater the performance gains realized. Long-term (more than six months) programs produce impressive gains of approximately 44%. Intermediate programs (one month to six months) realize gains of approximately 30%, and short-term programs (less than a month), about 20%. It is not possible from the studies we reviewed to explain this trend but there are many possible reasons. For example, it is our impression that many of the short-term incentive programs we reviewed were conducted on college campuses where incentives were used to increase performance of boring, repetitive, and generally uninter-

Table 3
The Effect of Amount of Competition for Incentives on Performance

Incentive Competition	% Gain	Effect Size	Lower	Upper	# of Studies
Non Competitive	22	0.64	0.59	0.68	57
Competitive	27	0.79	0.63	0.95	7
Mean (Total)	***22***	***0.65***	***0.60***	***0.69***	***(64)***

Table 4
Effects of Incentive Program Term on Performance Increases

Term	% Gain	Effect Size	Lower	Upper	# of Studies
Long	44	1.28	1.08	1.48	5
Intermediate	29	0.85	0.72	0.98	13
Short	20	0.58	0.53	0.63	46
Mean (Total)	***22***	***0.65***	***0.60***	***0.69***	***(64)***

esting tasks. These tasks seemed not to relate to what the students were studying or their career aspirations. It is also possible that in longer-term programs, performance specialists are able to tweak and tune the program so that it makes a better fit with the people involved and their organizational culture. Thus, the larger gains from longer term programs may indicate a "learning curve" for everyone that pays off in performance increases. Moderating this "learning" effect might also be other factors that increase performance not associated with the incentives such as increases in skill levels and other organizational efforts that impact performance. Intermediate- and long-term incentive programs were typically used in actual work settings where employees were receiving incentives to perform tasks that were part of their jobs. Another way to look at these data is with a sense of surprise that in short-term incentive programs, performance of boring and largely irrelevant tasks could be enhanced 20%. Therefore, we feel that a 20% increase in performance in these short-term programs may be the lower limit of their productivity and so our data support the use of short-term incentive programs. Finally, since the trend to realize greater performance gains with increasing the length of the incentive program term is matched with a *decrease* in the number of analyzable studies, it is possible that the spectacular long-term gains are somewhat artifactual.

5. Team and Individual Incentives

The most dramatic finding in our analysis was a 48% increase in the performance of teams who were offered incentives compared with a 19% increase for individually based programs. Clearly, team-based incentive programs (where the team, not the individuals in the team are rewarded for increased performance) seem to have an extraordinary impact on performance if the seven studies we reviewed are representative of team incentive programs (again, note previous statements regarding possible effects of comparing statistical results based on unequal sample sizes). We believe that this finding is due to the psychology of team or group motivation. Teams are not merely collections of individuals. When teams of individuals work together for a time, their motivation changes in subtle but important ways. Bandura (1997) has discussed

Table 5
Effects of Team and Individual Incentive Programs on Performance

Participants	% Gain	Effect Size	Lower	Upper	# of Studies
Individual	19	0.55	0.50	0.59	55
Team	48	1.40	1.27	1.53	9
Mean (Total)	***22***	***0.65***	***0.60***	***0.69***	***(64)***

the evidence for these changes in detail. He describes a large body of research on "social loafing" that indicates a strong tendency of some individuals to invest significantly less effort in teams than when they are working and being assessed as individuals. He also provides compelling evidence that team motivation is largely determined by three factors: (1) value for work goals; (2) beliefs that other team members have the separate skills needed to accomplish the goal; and (3) beliefs that the team will collaborate effectively and that each member will invest maximum effort. Bandura's summary also notes that social loafing can be eliminated almost completely by assessing the individual contributions of each team member but giving incentives to the entire group. We hypothesize that the best incentive programs assess the contributions of individual team members and therefore eliminate the social loafing that has depressed the team's performance. Incentive programs might also increase team member values for their work, their appreciation of the skills of their teammates and their willingness to collaborate. Our analysis provides a solid base of evidence that team incentives can have a huge impact on team performance. Even though individual incentives do lead to performance gains, team incentives might be much more cost-effective.

6. Mental and Physical Work Tasks

Our analysis uncovered a significant difference between the impact of incentives on mental and physical

Table 6
A Comparison of Incentives for Mental and Physical Work

Task Type	% Gain	Effect Size	Lower	Upper	# of Studies
Cognitive Work	20	0.60	0.55	0.65	38
Manual Work	30	0.88	0.78	0.99	26
Mean (Total)	***22***	***0.65***	***0.60***	***0.69***	***(64)***

Table 7
The Effects of Incentives in Three Types of Studies on Performance

Study Context	% Gain	Effect Size	Lower	Upper	# of Studies
Work Simulation	24	0.71	0.58	0.83	7
Lab Experiment	23	0.69	0.61	0.77	27
Field Study	21	0.61	0.55	0.67	30
Mean (Total)	***22***	***0.65***	***0.60***	***0.69***	***(64)***

work. Giving incentives for working smarter produced a gain of 20% whereas incentives for increases in manual labor yielded average performance gains of 30%. The difference may be due in part to the difficulty researchers encounter in attempting to generate reliable and valid measurements of these two types of work tasks. Another source of difference between physical and mental work is the ease with which they can be increased even when workers desire to do more to receive incentives. Physical work most often involves construction or assembly tasks where process and product results are directly observable and measurable. Measures of physical work have a very long history and are marked by high levels of reliability and consensus among raters. Cognitive work processes are difficult to observe directly and must be inferred from its products or outcomes. Instruments for evaluating cognitive work tend to be less reliable and subject to considerable disagreement among experts. In addition, physical work is most often automated and so may be more easily speeded when workers are more motivated. Cognitive work is more novel, involves greater mental effort to speed, and may be less susceptible to motivational incentives. These issues should be examined in future research.

7. Incentive Study Type

In spite of apparent differences in the "authenticity" of field settings for incentive studies, our analysis of a large number of studies indicated that the setting for the study did not have an influence on the study result. The small differences in performance gains among the three types of settings we examined were not statistically significant. Even the result based on the relatively few Work Simulation studies was not significantly different from the other two results. This suggests that when baseline performance is assessed before a study begins, studies in any of these three settings produce valid indicators of performance changes due to incentives.

8. Quantity and Quality Performance Goals

In a great number of studies we found that whether the goal was to improve quantity of performance or quality of performance, incentives had a positive effect. Furthermore,

Table 8
Effects Incentives on Work Quantity and/or Quality of Performance

Study Outcome	% Gain	Effect Size	Lower	Upper	# of Studies
Quantity	21	0.63	0.58	0.68	48
Quality	26	0.76	0.64	0.88	15
Both	15	0.45	-0.01	0.92	1
Mean (Total)	***22***	***0.65***	***0.60***	***0.69***	***(64)***

no significant difference between the quality and quantity of work performance was found. Only one of the studies we examined measured both the quality and quantity, so we advise against attempting to generalize its poor results. There is no plausible reason to expect that the measurement of both quantity and quality of performance should reduce the impact of incentives so the results of the one study should not be generalized. The best conclusion from this analysis is that regardless of the kind of performance benefit management is attempting to realize, incentives appear to be beneficial. While Table 8 indicates a slightly higher quality gain over quantity of performance, our analysis (based on the overlaps of the 95% confidence intervals) indicates that the difference is not significant.

9. Motivation Outcome

Incentives appear to have had significantly less impact on getting people to start doing a new job than on persisting at a job once they start it or on working smarter. Incentives increased persistence 27% and mental effort 26%. Persistence and mental effort gains were not significantly different from each other. Yet, the fact that choosing to do a new job resulted in positive but significantly lower performance, reflects the impression of a number of organizational

Table 9
Effects of Incentives on Three Types of Performance Motivation Outcomes

Motivation Outcome	% Gain	Effect Size	Lower	Upper	# of Studies
Choice	15	0.43	0.35	0.50	7
Persistence	27	0.79	0.73	0.86	42
Mental Effort	26	0.76	0.64	0.88	15
Mean (Total)	***22***	***0.65***	***0.60***	***0.69***	***(64)***

change and work design professionals. It is possible that people resist starting new jobs or tasks because they believe that their lack of experience requires much harder work to succeed than on a more familiar job task. Thus, even with incentives, increased commitment to new work is not as "cost beneficial" as persisting or working smarter at familiar work. New work requires new learning and the performance errors that accompany learning. While a 15% increase in choosing to do new work (a result based on the fewest number of studies) is important and beneficial, further research on this issue would help performance technologists understand how to motivate engaging in new or changed tasks.

Summary and Conclusions

Published research articles which dealt with the use of incentives to motivate performance were identified. Of approximately 600, 45 were of sufficient quality as to warrant inclusion in the meta-analysis. The point of the meta-analysis was not only to identify an overall effect size for incentives, but to determine whether any variables mediated or moderated the effect of incentives on performance. Nine such variables (or factors) were identified: location of study, incentive type, incentive competition, program term, team and individual incentives, mental and physical work tasks, study type, and quantity/quality performance goals.

The main result of this study is strong support for the claims that incentives can significantly increase work performance when they are carefully implemented and performance is measured before and during incentive programs. While none of the published studies provided a cost-benefit analysis of incentives, what would be the financial benefit of increasing performance 22% in most organizations? Since this is the mean gain that can be expected based on well-designed studies, it is the place to start with an analysis of the reasonable return on an investment in incentive programs for increased work performance. When specific features of incentive programs were analyzed, it was obvious that some programs produced significantly more than 22%. The most impressive example is the 48% increase in team performance (albeit such an increase being represented by an analysis of only 9 studies). We caution readers that it is likely that this large an increase requires the assessment of the individual contributions of every member of a team and careful planning of a team incentive program. Another indication of the power of financial incentives is the evidence that the longer they are in place, the greater the performance gain realized. Brief programs (less than a month) produced gains averaging 20%, but beyond six months gains for all programs averaged 44%. Our analysis of the programs conducted in laboratories, work simulations, and in real work locations did not indicate that the location influenced the amount of gain over time (for example, it might be claimed that gains were smaller in boring or artificial laboratory studies that tended to be shorter in duration). A more likely explanation of the greater long-term performance gains is that a "learning curve" effect reflects positive local adjustments in programs over time that lead to a better fit for local organizational culture and prefer-

ences. We were also impressed with the different impact of incentives on performance that involved starting new work tasks (15% increase) when compared with persisting longer at a familiar task (27% gain) or working smarter (26% benefit). Finally, unlike previous studies, our analysis suggests that incentives improved performance whether that desired performance gain was qualitative (26%) or quantitative (21%) in nature.

Future research should be directed at replicating the present research, including the latest studies, and looking at such phenomena as the mechanisms involved in explaining the superior gains realized in team-directed, as opposed to individual-directed, incentives. Intangible incentives (such as Employee of the Month recognition without a plaque) should be examined to determine if they can have a positive effect on employee performance. Finally, follow-up research needs to be conducted to determine is there is a sort of whiplash negative effect on performance when incentive programs end.

Study Limitations

It is important to note that this kind of analysis cannot describe the features of incentive programs that produced performance gains. Readers are cautioned to note that only the most carefully planned and implemented programs are subjected to rigorous research. We hope that the results of this analysis will stimulate more interest in both new research on the use of incentives and more systematic thinking about how to design the most powerful incentive programs. For example, we need studies that address the cost-benefit of incentive programs and that compare the use of gift, money and social incentives. These areas are either poorly researched or are ignored in the current research literature.

In addition, we were very concerned that in hundreds of published incentive studies, only 45 actually measured performance levels before an incentive program was introduced. Establishing a pre-incentive performance baseline seems to be such an elementary but critical requirement in human performance evaluation that we were surprised and disappointed at how seldom studies are designed so that their results can be interpreted. That is, most published research ignores common and shared standard procedures for the design of research, data collection, analysis, and reporting. Studies often lack comparison groups or controls; standard deviations are not reported; multiple shifts in treatments are implemented from one group to another so that it becomes impossible to determine which single variable might be responsible for a performance difference. These and other defects make for decreased credibility in human performance technology. If research is to be taken seriously and believed, then it must subscribe to standard operating procedures. Meta-analytic software has made it easier to compare and contrast various research findings. But this software does nothing to improve the quality of the research it is designed to analyze. That job falls to journal editors and to the researchers themselves. We all would benefit from more agreement to adhere to minimum research protocols.

Notes

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[2] In general, studies that result in an average effect size of one standard deviation increase in performance predict a performance increase of 34%. Two standard deviations of increase yield a performance increase of about 68%. Effect sizes are expressed in a percentage of a standard deviation—so an effect size of .50 is half of the first standard deviation or .5 x 34% = a 17% increase in performance. Readers who want more information on the way that meta-analysis allows for the estimation of the average percentage increase in performance from the percentage of standard deviation gains in existing studies are advised to read a book edited by Harris Cooper, Larry Hedges and others (1994) *The Handbook of Research Synthesis*. Russell Sage Foundation ISBN: 08721542269.

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